

SARDAR PATEL UNIVERSITY

Programme: B.Sc (Physics)

Semester: IV

Syllabus with effect from: November/December-2012

Paper Code: US04CPHY01	Total Credit: 3
Title Of Paper: Electromagnetic Theory And Spectroscopy	

Unit	Description in detail	Weighting (%)
I	Electrostatics Electric field: Brief introduction to Gradient, Divergence, Curl and Coordinate Systems, Coulomb's Law, The Electric field, Continuous charge distribution, Divergence and curl of Electrostatic fields: Field lines, Flux and Gauss's law, The Divergence of E, Application's of Gauss's law, The Curl of E, Electric Potential: Introduction to potential, Comments on potential, Poisson's equation and Laplace's equation, The potential of a localized charge distribution, Work and Energy in Electrostatics: The work done to move a charge, The energy of a point charge distribution, The energy of a continuous charge distribution, Related Numericals	
II	Magnetostatics The Lorentz Force Law: Magnetic fields, Magnetic forces, Currents, The Biot-Savart law: Steady currents, The Magnetic field of a steady current, The Divergence and Curl of B: Straight-Line currents, The Divergence and Curl of B, Applications of Ampere's law, Comparison of Magnetostatics and Electrostatics, Magnetic Vector Potential: The Vector potential, Summary; Magnetostatic boundary conditions, Multipole expansion of the vector potential, Related Numericals	
III	Atomic Spectra Investigation of Spectra, Production of Spectra, Types of Spectra, Wave Number, The Spinning Electron, Space Quantization, Quantum Numbers and their Physical Interpretation, L-S Coupling, J-J Coupling, Experimental study of Zeeman Effect, Classical Interpretation of Normal Zeeman Effect, Anomalous Zeeman Effect, Stark Effect	
IV	X-ray Spectra Production of X-rays, X-rays, Light and Electromagnetic Spectrum, Diffraction of X-Radiations, Bragg's law, Continuous X-ray spectrum, Characteristic Emission Spectrum, Characteristic absorption Spectrum, A Close Survey of Emission Spectrum, Explanation of Emission and Absorption Spectra, Comparison of Optical and X-ray Spectra, Moseley's Law, The Fluorescence yield and Auger Effect	

Basic Text & Reference Books:-

- Introduction to Electrodynamics
David J Griffiths, Prentice-Hall of India Private Ltd.
- Electricity and Magnetism
A S Mahajan and A A Rangwala
Tata McGraw Hill Publishing Company Ltd
- Elements of Electromagnetics
Sadiku, Oxford University Press
- Elements of Spectroscopy
S L Gupta, V Kumar, R C Sharma, Pragati Prakashan
- Molecular structure and Spectroscopy
G Aruldas, Prentice-Hall of India Private Limited

